

1 **Title: General practitioners' experiences and perceptions of early**
2 **detection of liver disease**

3

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13

14 **Abstract**

15 Background: The incidence of liver disease is increasing in the UK and primary care is a key
16 setting where improvement in the detection and management of liver disease is required. Little
17 is known about general practitioners' (GPs) understanding and confidence in detecting liver
18 disease.

19 Aim: To explore GPs' experiences of liver disease with a focus on early detection and
20 interpretation of liver function tests (LFTs).

21 Design and setting: Qualitative study employing semi-structured interviews. Purposive sample
22 of 25 GPs from five study sites.

23 Method: Telephone and face-to-face interviews. Data were analysed thematically, using a
24 constant comparative approach.

25 Results: Four themes were identified from the data: test requesting behaviour, challenges in
26 diagnosing disease, access to specialist tests, and guidance and education. Participants'
27 descriptions of how they request and interpret LFTs varied widely. Concern over missing
28 diagnoses was a common reason for requesting blood tests; patients with mildly abnormal
29 LFTs and those at risk of non-alcoholic fatty liver disease (NAFLD) were a particular cause of
30 concern. GPs saw themselves as generalists, with a reluctance to take on specialist
31 investigations. Guidelines promoted confidence for some clinicians, but others felt that liver
32 disease was too complex to be amenable to simple instructions. Most felt that they did not have
33 access to relevant, focused education on liver disease.

34 Conclusion: Liver disease is not perceived as a priority in primary care. If GPs are to take on a
35 greater role in identification and management of liver disease, support is needed to promote
36 awareness, knowledge and confidence.

37

38 **Key words: (MeSH headings)** Liver diseases; Liver function tests; Early diagnosis; General
39 Practice; United Kingdom

40

41 **How this fits in?**

42 Liver disease is a major cause of premature mortality in the UK; primary care has been
43 identified as an area where major improvement is required.

44 This study explores GPs' understanding and experiences of identifying liver disease.

45 Our findings add to growing evidence of a lack of confidence amongst GPs in this area, and
46 identify Non-alcoholic fatty liver disease (NAFLD) as a particular area of diagnostic and
47 management concern.

48 Further research should focus on the most effective way of providing support, guidance and
49 training for GPs in the identification and management of liver disease.

50

51

52 **Introduction**

53 The incidence of liver disease is increasing faster in the UK than in any other European
54 country,(1)(2) Liver disease is already one of the leading causes of premature mortality in the
55 UK, responsible for 61,000 years of working life lost each year. (3) These rises are linked to
56 increases in alcohol consumption and obesity. (4, 5) The Chief Medical Officer and an All Party
57 Parliamentary group on liver disease have identified early detection as a public health priority,
58 citing evidence that this will reduce disease progression. (6, 7) Despite detection and
59 management of chronic diseases being a major part of the work of general practice, there have
60 been calls for urgent improvement in primary care for patients with chronic liver disease. (8)

61

62 Early detection of liver disease is a challenge. Many patients have few symptoms until the
63 condition is advanced, when intervention may be ineffective. Liver function tests (LFTs) are a
64 panel of blood tests commonly requested in primary care. However, LFTs on their own are a
65 poor diagnostic tool. Recent guidance from the National Institute for Health and Care Excellence
66 (NICE) advises against relying on routine blood tests to rule out disease such as NAFLD and
67 cirrhosis from all causes.(9, 10) Interpretation of LFT results is not straightforward,(11) with

68 algorithms developed to support general practitioners (GPs) (12, 13) and only very recent
69 publication of national guidelines to support the interpretation of abnormal liver blood tests. (14)
70 A recent Lancet Commission on liver disease has highlighted the need to improve expertise and
71 facilities in primary care to strengthen detection.(3) Current evidence promotes the use of new
72 investigations to detect the presence and severity of liver disease, such as serum tests for
73 fibrosis and transient elastography.(15, 16) However, these tests are not widely available, and
74 GPs' understanding of their role in detection and management of liver disease in primary care is
75 unknown. With multiple, competing priorities, it is not clear that GPs perceive early diagnosis of
76 liver disease to be an important area for clinical education and service development.

77

78 This paper explores GPs' experiences of identifying and managing liver disease of all causes,
79 with a focus on early detection and the interpretation of blood test results.

80

81 **Methods**

82

83 **Design and participants**

84 Qualitative semi-structured interviews were conducted with GPs from five geographical areas in
85 England (North East and North Cumbria; North West London; Thames Valley and South
86 Midlands; Yorkshire and Humber; Wessex). Ethical approval for the study was granted by
87 Newcastle University (Ref 151073). Participants were recruited via Clinical Research Networks
88 and local networks of GP practices, using email invitations. Purposive sampling in the five areas
89 was utilised to ensure that we captured a variety of perspectives and varying levels of clinical
90 experience and knowledge in general practice, hepatology or gastroenterology.

91

92 A semi-structured interview schedule was developed by the research team to cover topics
93 identified from published literature, including GPs' experiences of requesting and interpreting
94 LFTs and the availability of guidelines and educational resources on detection of liver disease.
95 The interview guide evolved throughout data collection to enable exploration of emerging topics.
96 When the data were judged to be sufficient and no longer developing in depth and complexity,
97 recruitment ceased. Participants were interviewed face-to-face or on the telephone, and all
98 interviews were audio recorded, and transcribed verbatim. The NVivo 10 software package was
99 used to manage the data.

100

101 **Data analysis**

102 The study design was informed by Glaser and Strauss' constant comparative approach.(17)
103 Data collection and analysis ran concurrently throughout the study, analysis of early transcripts
104 informed the interview schedule for later interviews and early transcripts were revisited
105 throughout the analysis process. Familiarisation with the data involved a detailed reading of the
106 transcripts. This was followed by line-by-line and highlighting approaches for coding the
107 data.(18) Field notes were used throughout analysis as part of the reflective process. To ensure
108 the trustworthiness of the data, a proportion of the transcripts (20%) were coded independently
109 by three researchers, before comparing and agreeing on themes. The wider research team
110 were involved in discussions around emerging themes, this included individuals with experience
111 in general practice, hepatology, and alcohol and health behaviours.

112

113 **Findings**

114 Twenty five GPs (12 male and 13 female) took part in interviews; two were conducted face-to-
115 face, and 23 by telephone. Interviews lasted between 15 and 50 minutes. Participants' clinical
116 experience ranged from three years of GP training to over twenty five years in general practice.
117 Only four participants had undertaken any specialist training in hepatology or gastroenterology.
118 Practice populations served by the GPs varied widely in size and characteristics, from urban
119 practices with a high degree of substance misuse to rural practices with primarily elderly
120 populations. Characteristics of the study participants are shown in Table 1.

121

122 (Table 1 here)

123

124 Four themes were identified from the data: test requesting behaviour, confidence and
125 challenges in diagnosing disease, access to specialist tests, and guidance and education. In the
126 following section, quotations are presented to illustrate the majority and any extreme views.

127

128 **Test requesting behaviour**

129 All of the interviewees reported that liver function tests (LFTs) were part of routine practice in
130 primary care. These were often ordered by other members of the primary care team as part of
131 'routine health checks' or to monitor long term medication use, as well as by GPs for
132 symptomatic patients. Some GPs saw abnormal LFTs as a way to encourage patients to modify
133 their behaviour, and used them in high risk patients as part of a lifestyle intervention.

134

135 *"You might do the LFTs just to sort of encourage people, because often, an*
136 *abnormal result can make them feel that, actually, there is a problem and they*
137 *need to do something about it."* (GP 16, partner, qualified more than 20 years)

138
139 Several interviewees admitted to using LFTs as part of a 'defensive medicine' strategy to avoid
140 missing a serious diagnosis with an undefined problem. As a result, there was a feeling that too
141 many LFTs were being requested, creating unnecessary work for GPs. This increase in
142 workload had prompted some GPs to become more cautious, although they acknowledged that
143 their decisions about when to request LFTs were not necessarily based on evidence.

144
145 *"I try to have a reason to do it because I got the sense that you could find an*
146 *abnormal test that's not significant. So I deliberately think about why I need to*
147 *do before I do them. So I don't know of the evidence of when we should be*
148 *doing them, so no, I don't do them in that way."* (GP 13, partner, qualified more
149 *than 20 years)*

150
151 A number of the interviewees indicated that their decision to request LFTs was influenced by
152 their perception of the potential benefits of treatment. If a possible diagnosis of liver disease
153 would not affect the patient's outcome, they felt that testing for it was futile.

154
155 *"I'm all for identifying people who have a condition that is going to have an*
156 *impact on them, and trying to do something about that, but I don't know.*
157 *Sometimes it feels, fatty liver for example is it...? What is the evidence that you*
158 *can make any difference to that? If somebody is obese and has a fatty liver is*
159 *there anything specifically an issue about their liver, or actually is it just part of*
160 *the whole thing that it needs lifestyle change"* (GP 5, partner, qualified more
161 *than 20 years)*

162
163 For some patients, participants suggested that efforts might be better focused on lifestyle
164 intervention rather than testing for specific conditions.

165 166 **Confidence and challenges in diagnosing disease**

167 Whilst interviewees reported that they dealt with LFTs on a daily basis, this did not necessarily
168 mean that they felt confident interpreting the results. Some of the GPs reflected that they were

169 detecting fewer patients with liver disease that is predicted by national statistics. This led to
170 concerns that they were missing diagnoses.

171

172 *“I slightly worry, having done this [interview] that I'm missing some.” (GP 15,*
173 *partner, qualified 15 years)*

174

175 However, others felt that they were competent at diagnosing liver disease and did not perceive it
176 as an area where their practice needed improvement.

177

178 *“I don't think it's an area where GPs are frequently missing the diagnosis, or*
179 *delaying the diagnosis. I think, because it's so easy to get LFTs, and because*
180 *most diseases, whether its cancer, hepatitis, or alcoholic liver disease, they're*
181 *pretty prevalent, you know, so we're used to dealing with them.” (GP 2, partner*
182 *qualified for more than 20 years)*

183

184 Diagnosis and follow up of patients with NAFLD was identified as a challenge. Concerns related
185 to identifying disease in high risk groups, and knowing when to refer and how often to follow up.
186 Some of the interviewees felt that they may be overlooking diagnoses of NAFLD in high risk
187 groups. Currently, there is no universally approved method of identifying patients with NAFLD in
188 UK general practice and several of the participants felt this may be contributing to missed
189 diagnoses.

190

191 *“I think we probably miss a lot of liver disease which is non-alcoholic fatty liver*
192 *disease, particularly in diabetics. We probably sit and wait on those patients*
193 *more than we should be, and I think what we really should be doing is being a*
194 *bit more proactive, and calculating a fibro-score, and all the other things, so I*
195 *think they're a group there where we could improve, as well.” (GP 1 - GP*
196 *registrar)*

197

198 A diagnosis of NAFLD may lead to a referral to secondary care. Participants suggested that
199 often the outcome of such a referral was lifestyle advice, which they felt could have been offered
200 in primary care saving specialists' time for more complex issues. A more confident approach to
201 such referrals was proposed.

202

203 *"We are sort of thinking, "God, what should we do? Let's let the liver*
204 *specialists decide", even though they're just going, "It's a fatty liver, cut down*
205 *his alcohol, control his cholesterol." You think, "Okay, I could've done that*
206 *really. That's what we were going to do." So I think giving us more confidence*
207 *in managing the simple things, and then the consultants can actually get on*
208 *and do the difficult things." (GP 11, partner qualified 13 years)*

209
210 GPs in our study commented that they were unaware of any structured approaches for following
211 up patients with 'mild' NAFLD. This led to concerns that evolving disease may be
212 underestimated. It was proposed that, in line with other chronic diseases, there should be a
213 recall system within primary care for patients with NAFLD meaning this patient group would
214 receive more standardised care.

215
216 *"I guess, and this is what we're not doing at the moment that perhaps we*
217 *should be with our fatty liver patients, you know, our patients who are*
218 *diagnosed with fatty liver disease who aren't being- haven't needed referral up*
219 *or being monitored by secondary care, whether we should have some in-*
220 *house policy or way of monitoring them every so many years, just to see if*
221 *there is any change in their blood testing. Rather than it just being a random*
222 *thing, that it should be part of a sort of recall system. We haven't got that set*
223 *up." (GP 16, partner qualified more than 20 years)*

224
225
226 Minimally deranged LFTs, predominantly transaminases, are a very common finding in primary
227 care. However, an abnormal transaminase result does not always reflect the level of the
228 underlying liver damage. Our participants commented that interpreting minor abnormalities in
229 LFTs and deciding on a suitable course of action was a challenge, and could be a source of
230 anxiety.

231
232 *"It's quite easy to refer when you've got really abnormal LFTs and an*
233 *abnormal ultrasound. It's the people that fall in the middle that are the most*
234 *difficult so they're the people with the borderline raised LFTs, with maybe a*
235 *little bit of fatty liver on an ultrasound but nothing else. They're the ones that*
236 *are the most difficult. Do you just monitor? Do they still need referral? Are they*

237 *at risk of future liver disease? I'd say they're the tricky ones actually." (GP 23,*
238 *salaried, qualified 2 years)*

239

240 **Access to specialist tests**

241 Alongside the standard LFT panel, most of the GPs in our study were able to make direct
242 requests for ultrasound scans and extra diagnostic blood tests which are usually referred to as
243 the 'liver screen.' A majority of participants expressed a view that the role of the GP is as a
244 generalist, and if extra investigations are required to make a diagnosis these should be
245 requested by secondary care clinicians. Time pressures, alongside lack of specialist knowledge,
246 were cited as reasons why further investigation was considered inappropriate in the primary
247 care setting.

248

249 *"I think we'll have to accept our limitations as general practitioners, and if there*
250 *is anything more complex that's coming up, they're better off seeing the*
251 *specialist than having me guess at what the results show, so I'm quite happy*
252 *with what we have available." (GP 7, partner, qualified 10 years)*

253

254 The interviewees were prompted during the study to describe what any 'further tests' may entail.
255 Some acknowledged that they were unaware which additional tests may be available. A small
256 number of the GPs interviewed suggested that additional investigations would be useful, in
257 particular expanding the routine blood panel to include aspartate aminotransferase (AST) and
258 direct access to elastography (fibrosan). However, it was recognised that any increased
259 responsibility for requesting and interpreting results would need to be accompanied by
260 education.

261

262 *"As I said, we need, which are in the USA, ultrasound elastography, we don't*
263 *have direct access to that, to the ultrasound elastography, so that is something*
264 *which might be useful. But it's having access, and also, another thing is*
265 *educating us to interpret the results" (GP 12, partner, qualified 16 years)*

266

267 **Guidelines and education**

268 Amongst our study participants there was no universal approach to the use of local or national
269 guidelines to assist in the diagnosis of liver disease. Some of the GPs were aware of local
270 guidelines, and used them regularly; others would search for help on national GP resource

271 websites if needed. Several GPs were not aware of any specific local or national guidelines and
272 a few admitted to knowing of guidelines, but choosing to employ their own systems devised
273 from experience.

274

275 *“I mean, the guidelines say, if you’ve got an ALT more than three times the*
276 *upper limit of normal, repeated on one or two more occasions, then that would*
277 *be a criteria; but it’s not particularly one that I use, I would tend to monitor*
278 *those.” (GP1, GP registrar)*

279

280 When guidelines were used, they helped to increase GP confidence in their own diagnostic
281 ability. These guidelines were perceived to have had greater impact on clinician’s confidence
282 where they were embedded in routine practice, with computer based prompts or clear flow-
283 charts.

284

285 *“It just follows off the pathway, it’s quite a clear flowchart, if this*
286 *happens, does that happen, or if the other happened, refer on*
287 *based on what their fatty liver disease score would be. So, again,*
288 *that would be using national guidance, when to refer. So, quite*
289 *clear.” (GP 19, salaried, qualified 2 years)*

290

291 However, some interviewees suggested that interpretation of LFTs may not be as amenable to
292 simple rules of interpretation, because of the variation in what an abnormal result may mean for
293 the individual.

294

295 *“I don’t know whether it’s possible to say, “If it’s up above this amount you*
296 *need to do this or below this...” ... you know the way diabetes has flowcharts,*
297 *“If the HbA1c is above this you do and if it’s does this you do this.” You follow*
298 *those quite clearly, whereas liver function doesn’t really have an equivalent,*
299 *like iron monitoring for warfarin. So for other things we do follow quite strict*
300 *guidance, but for liver function we don’t really follow it so strictly. I suppose it’s*
301 *because it’s so dependent for each person.” (GP 11, partner, qualified 13*
302 *years)*

303

304

305 Most of the GPs interviewed expressed a desire for more education to help them effectively
306 identify and manage liver disease. There was a consensus that liver disease was not currently
307 promoted as a high priority area for primary care. Some participants commented that tailored
308 education around liver disease was limited.

309

310 *“We [GP’s] pick and choose what we learn and therefore things that are easy,*
311 *because they’re throwing training at us, which they are for cardiology, for*
312 *diabetes and mental health, they’re pouring that down our throats so we’re*
313 *jumping at all these things. But there’s only a certain amount of days you have*
314 *off to go on training and do things. Liver just hasn’t been there at the front,*
315 *therefore I think people who would’ve chosen it but it hasn’t really been*
316 *available very much so we’ve not done it. I think that probably is a problem.”*
317 *(GP 11, partner, qualified 13 years)*

318

319

320 **Discussion**

321

322 Our study suggests that liver disease is not perceived by GPs to be a particularly high priority,
323 but it is an area where they lack confidence. Concerns were focussed on missing diagnoses
324 and uncertainty about how to respond to patients with mildly abnormal LFTs or those at risk of
325 NAFLD. A reluctance to take on additional specialist investigations appeared to be rooted in
326 GPs’ perception of their role as medical generalists. Overall, liver disease was seen as complex
327 and not a suitable topic for simple guidelines.

328

329 **Strengths and limitations**

330 This study describes the perceptions of GPs on the diagnosis of liver disease, and we believe it
331 is novel in its scope. GPs were offered no financial incentives to participate, yet we found no
332 difficulty in recruiting from any of the five geographical sites. Interviewees were self-selecting, and
333 from practices known to local clinical research networks. However, the richness and breadth of
334 the data imply that this was not a major limitation, with participants displaying a readiness to admit
335 uncertainty or lack of confidence. Our study was conducted just prior to the publication of UK
336 NICE guidelines on both NAFLD and cirrhosis.(9,10) These documents advocated for change to
337 current practice. Participants may have been aware that guidelines were in development, but

338 there was no time for them to have influenced experiences of diagnosing liver disease in primary
339 care.

340

341 **Comparison with existing literature**

342 Our findings of GPs' reported test requesting behaviour are consistent with those reported in the
343 qualitative arm of a large study looking at testing strategies for liver disease in primary care.(12)
344 However, that study was focused on test ordering behaviour, and unlike ours, did not explore in
345 any detail GPs' experiences of diagnosing liver disease. The use of tests to change patients'
346 behaviours, the defensive nature of testing and the feeling that tests were requested too often,
347 were common themes with our work. Our findings support the recent Lancet report, which
348 suggests that primary care clinicians require clear guidance on the use of LFTs and the need for
349 specialist referral.(3)

350

351 A recent study in North America explored primary care physicians' awareness of, and current
352 practice related to NAFLD.(19) Knowledge of diagnostic tools and understanding of the difference
353 between 'fatty liver' and more progressive disease were found to be poor, although this brief on-
354 line survey was unable to explore the reasons behind the findings. Several GPs in our study
355 indicated that NAFLD was an area they found challenging; in particular, knowing how best to
356 assess risks and follow up patients. Clinicians suggested that referral often resulted only in
357 lifestyle advice, which they felt could be offered in primary care. Other work beyond the UK has
358 also identified NAFLD as an area where enhancing knowledge in primary care practice may be
359 helpful.(20, 21)

360

361 Difficulties over interpretation of minimally deranged liver function tests may be due in part to the
362 well documented discordance between blood test abnormalities and extent of liver damage. In
363 other conditions managed by GPs, the relationship between abnormal blood tests, clinical
364 decision-making and pathology is often more clear cut (e.g. in chronic kidney disease). GPs also
365 reported varying use of guidance when managing liver disease. In contrast to other chronic
366 conditions (22), much local and national guidance on liver disease is focused on aetiological
367 factors such as alcohol.(23) The relevance to patients with liver disease of different aetiology may
368 not be apparent, even when the recommended management pathway is still appropriate.

369

370

371

372 **Implications for research/practice**

373 Our findings suggest that liver disease should be a target for improved practice in primary care
374 and that GPs would be receptive to greater support and the promotion of a standardised
375 approach to investigation and management. This will require adequate resourcing and a better
376 understanding of precisely how to improve practice in this area. It is important to acknowledge
377 that many determinants of the rise in chronic liver disease are social and political, and for action
378 by GPs to be effective, it will need to be part of a broader public health strategy. Work is
379 underway, (6, 7,8, 14) but the development of up to date guidance, clinical tools and educational
380 initiatives is relatively recent (9, 10, 14) Many GPs do not have access to recommended non-
381 invasive tests (e.g. transient elastography and blood biomarkers), and this will need to be
382 addressed if the guidance is to be implemented. (9, 10)

383
384 Early intervention can be effective for all the main causes of liver disease, including NAFLD,(24)
385 alcoholic liver disease, (25, 26) and viral hepatitis. Targeted, brief interventions are supported by
386 a growing body of evidence, (27,28) curative treatments have been developed for hepatitis C, and
387 new anti-fibrotic medication will soon be widely available for all cause liver fibrosis.(29) Crucially,
388 all of these depend on awareness and early detection in primary care, and this is an area that
389 urgently requires further research and development.

390

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393

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405

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538 **Table 1: Characteristics of study participants**

Characteristic	Number of participants
Sex	
○ Male	12
○ Female	13
Years of experience as GP	
○ <5	5
○ 5-15	10
○ 16-25	9
○ >26	1
Gastroenterology experience or training	
○ Yes	4
○ No	21
Size of practice (registered patients)	
○ <5000	5
○ 5-10,000	9
○ 10,000 – 15,000	9
○ >15,000	2
Area of England (NHS regions)	
○ North West London	7
○ Wessex	8
○ North East and Cumbria	5
○ Yorkshire	1
○ Thames Valley and South Midlands	4